Incorporating "The Illuminating Engineer."

Light and Lighting

Official Journal of the Illuminating Engineering Society.

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Edited by J. STEWART DOW

Telephone: ABBey 5215.

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Principal Contents:

The Gas Light of The Future

BUT two months ago we recorded the development of a tubular luminescent electric light of high efficiency and agreeable quality (March, 1940, p. 37)—a noteworthy advance in such times as these.

Last month (see p. 79) members of the Illuminating Engineering Society heard from their President and members of his staff something of the work being done behind the scenes in the field of gas lighting.

In two respects those concerned with gas lighting are fortunate. The luminous efficiency of a low pressure lamp is said to be only about 0.2 per cent. even to-day—how vast, therefore, the possibilities of improvement. Further, there are *two* distinct avenues of approach—through the burner and the mantle. In the first direction, by studying processes of combustion, substantial advances in efficiency have been gained and are still in prospect. Yet the possible gain here, though useful, is not enormous. On the purely thermal radiation theory an increase of 100 per cent. may be the limit.

Very different, however, is the position when the mantle is considered. Here, as in electric lighting, luminescence may come to our aid. It is a singular thing that from the days of Welsbach onwards the accepted thoria-ceria combination has scarcely been bettered. Yet once the relation of luminescence to the mantle is accepted "the barriers are down," and there is no theoretical reason why lighting efficiency should not be advanced ten or a hundredfold in time to come. No doubt, as Mr. C. A. Masterman said at the meeting, these "long term" investigations are of a character well worth pursuing during the present period—which should not be allowed to impose a black-out on scientific endeavour.

I.E.S. Session Terminates

With the holding of its annual meeting on May 7, the I.E.S. has come to the end of an eventful session. The informal luncheon, a new departure, proved to be a pleasant event. The President briefly reviewed recent events. Mr. F. C. Johnson (Home Office), Mr. E. A. T. Taylor (Ministry of Home Security), and Sir Duncan Wilson (H.O. Factory Department) said some kind things about the services rendered to the Authorities. Mr. J. W. Howell responded to the toast of "Our Visitors" on behalf of the representatives of local centres present, who met in conference during the afternoon. In spite of the present conditions all the active local centres were represented, and there was a very helpful exchange of experiences. At the subsequent annual general meeting, the Report of the Council was, as anticipated, warmly accepted by members, on whose behalf Mr. Stephen Lacey and Mr. A. E. Iliffe expressed thanks to the officers and council. Very happy references were made by both to the sterling work done by the President, Mr. F. C. Smith. Of special interest was the announcement in regard to Fellowship, recorded in the next column. Two admirable papers were presented by Dr. J. W. T. Walsh ("The New Unit of Light") and by Mr. G. T. Winch and Mr. C. F. Machin ("The Physical Realisation of the C.I.E. Average Eye") to which further reference will be made in our next issue.

"We Cannot See Light"

Our editorial note on this subject (April, 1940, p. 59) has brought several comments, some philosophical, others recalling other contributions in which the idea was developed. Amongst the latter is Mr. G. V. Downer, who sends us a copy of a paper read by him at a meeting of the Incorporated Institute of British Decorators in 1938, and also a booklet containing extracts from articles in "The Architect and Building News" published in 1937. In both cases the truth that we cannot see light but only the objects illuminated by it is well stated, and is skilfully applied to the discussion of modern lighting problems. No doubt there are others who have written on this subject, and our note was not intended to assign credit only to the particular source quoted. A letter we have received from Dr. K. Norden aptly illustrates the antiquity of this conception—unfortunately, nevertheless, not so well understood or appreciated as it ought to be. He mentions that in his book on "Shadow and Diffusion" he is quoting a remark of the great physiologist, Ewald Hering, the antagonist of Helmholtz in Optics, to the following effect:—

> Our eye is not organised for perceiving light-waves as such, but for perceiving external objects through the intermediary of light-waves; the eye has to instruct us not about the intensity or quality of the light emitted by external objects, but about those objects themselves.

Scientific Blacking Out

We have come to the long days of summer and blacking out processes weigh somewhat less heavily. Owners of factories might well now give a little serious thought to their arrangements—in many cases substantially the same as those hastily improvised at the outbreak of war. A recent examination of a number of factories artificially lighted by various methods and adopting somewhat diverse policies in regard to screening, has convinced the writer of one thing—that it is worth while going to a great deal of expense and inconvenience in order to get as much benefit as possible from the natural light of day. After passing through large areas in which daylight is completely excluded and artificial light is used continuously throughout the day (a truly wasteful process!), one is conscious of immense relief when one enters a section where light from part of the window space is available. Even 20 per cent. is very valuable, in fact some rooms seem quite adequately lighted in these circumstances. If this is the impression of a casual visitor, how much greater must be the influence in the case of those working under these conditions day after day. The use of adjustable shutters on part of the window area combined with translucent white coatings to diffuse the light gives a most valuable mental stimulus. Of equal importance is the ventilation question—emphasised in a useful illustrated booklet recently issued by the Home Office Factory Department.

The Illuminating Engineering Society

CONDITIONS OF FELLOWSHIP.

The Council of the Illuminating Engineering Society is now prepared to proceed with the Scheme of Fellowship, approved by members at the special meeting on Dec. 5, 1939. An announcement to this effect was made at the annual general meeting on May 7.

The initial Board of Fellows has been established. This Board has framed rules of procedure to apply from now onwards, and has prepared the necessary form of application. Copies of the form can now be obtained from the honorary secretary by members who desire to apply for Fellowship.

Full information in regard to the conditions of Fellowship, as prescribed in the new by-laws, is given on these forms. It may be recalled, however, that a Fellow is required to be at least twenty-eight years of age, and to have been a Corporate Member for at least two years, to satisfy certain alternative conditions in regard to technical proficiency and experience, and to give the names of at least three Corporate Members in support of the application.

It is anticipated that the Board will be in a position to announce the first List of Fellows very shortly. It has, however, been agreed that the increased subscription involved (10s. 6d. per annum) shall not commence until Jan. 1, 1941.

The Effect of Adaptation on Subjective Brightness*

Mr. K. J. W. Craik, of the Psychological Laboratory, Cambridge, has been studying this fundamentally important but intricate problem of assessing what the eye really sees when exposed to an object of a certain measured brightness. We can judge, fairly correctly, when two sensations of brightness are equal, but no one can state when one sensation is judged to be twice as great as another. We can, however, infer from experiments that the subjective sensation experienced by the eye when exposed to a certain brightness in e.f.c. is enormously diminished when other much brighter objects are in close juxtaposition. The problem was attacked by Mr. A. W. Beuttell many years ago (the original instrument, together with Mr. Craik's present day development, was shown at the recent I.E.S. meeting devoted to "Photometric Reminiscences") and has since been examined by others. Criticisms have been levelled at most of the methods and processes adopted. But it appears that methods based on comparing the impressions of the two eyes in different states of adaptation (either by simultaneous or immediately successive comparison) are decidedly more accurate than those based on monocular memory matching. The ingenious apparatus described by Mr. Craik is of the binocular type and seems to make the task of the observer somewhat easier, in that he is not asked to adjust fields to equal brightness but only to say definitely whether one is brighter or darker than the other. The point of equal brightness is then found by a "bracketing" method. (Incidentally several interesting points affecting binocular vision emerge; mutual adaptive effect between the two eyes is only very small, yet the pupil size is fixed for both eyes by the brightest light falling on either.) Colour difference arising from the selective fatigue of the retina, which tends to create a bluish white colour, was not a serious difficulty, but the difference in *appearance* of the adapted field (uniform but watery and translucent) as compared with an "initial" field exposed to a dark adapted eye (solid, glowing white and opaque but patchy) was rather troublesome.

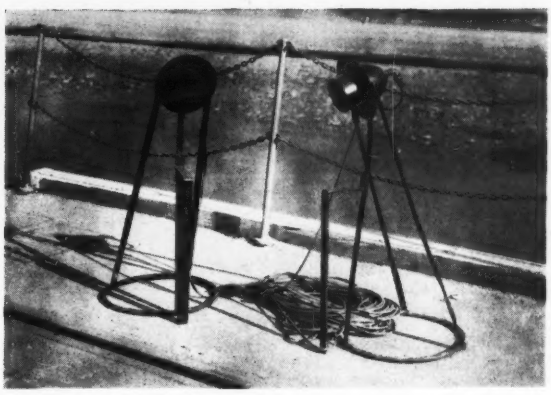
The process was, however, accurate enough for some interesting and consistent curves to be obtained, and some striking conclusions emerge. For instance, added subjective brightness increases little above 100 e.f.c. and is substantially constant above 1,000 e.f.c., where saturation is obtained. The magnitude of the effect of adaptation on subjective brightness may, however, be seen from the fact that an initial illumination of 3 e.f.c. presented to the dark-adapted eye is judged subjectively equal to 15,000 e.f.c. as seen by an eye adapted to that illumination—surely a result for illuminating engineers to ponder over in these days of twilight illuminations!

Any Ideas for I.E.S. Meetings?

We are now entering on the period when the spade work for the next season is necessarily done. Now is the time for members to make offers of papers or turn in any bright ideas for meetings. The preparation of a programme in such times as this is none too easy a task. All the more reason for members of the Illuminating Engineering Society to offer, individually, all the help they can.

* The Effect of Adaptation on Subjective Brightness by K. J. W. Craik (Proc. Roy. Soc. Lond., Jan., 1940. Vol. 128, pp. 232-247).

Unloading Barges in the Black Out



We are indebted to Mr. E. W. Murray for the accompanying picture illustrating some special fittings designed by Messrs. Ford, Ltd., of Dagenham, to illuminate the holds of barges whilst loading or unloading coal, ore, etc. The fittings are placed on the deck of the barge with the front projection over the combing, one at each end of the hold, where they provide good general illumination over the working area. The fitting, which utilises a 40 watt electric incandescent lamp, consists of an ingenious combination of the standard 0.02 ft.c. A.R.P. reflector with a standard car headlamp mask. The whole can be very easily separated into its component parts and reassembled.

Illuminating Engineering in Australia

Progress Towards Federal Organisation

It is announced in the I.E.S. Lighting Review of Australia that efforts are being continued with a view to creating a Federal Council for the various Illuminating Engineering Societies. General agreement has been reached between the two societies with headquarters in Sydney and Victoria, and a joint committee is exploring details. An event of considerable interest is the forthcoming inaugural meeting of the South Australian Society—the third to be started in Australia—which has already been promised influential support. The Victorian Society has also been active in other directions, for example, the promotion of a recognised course in illuminating engineering, the study of street lighting and glare from headlights, and the amendment of the Victorian Factories Act on the lines of the British Factories Act of 1937, in which a demand for adequate and efficient lighting was incorporated for the first time.

New Lighting Effects at the Golden Gate

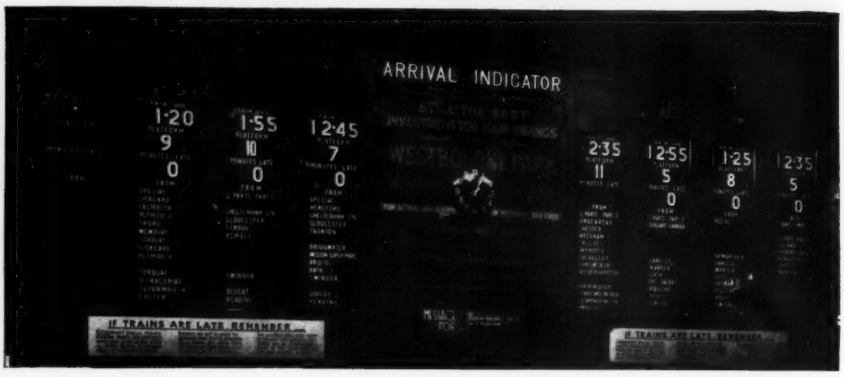
In darkened Europe it seems strange to read of the efforts being made to re-illuminate the dream city of Treasure Island for the reopening of the Golden Gate International Exhibition during the present month. Lavish use is being made of floodlights, underwater lighting, and fluorescent globes. One of the most ingenious devices is the finishing of the Exhibition buildings in a cement stucco mixed with a mica product which glitters under both natural and artificial lighting and has a peculiar effect of radiancy. "Illuminating Engineering" also describes the super-illumination of baseball grounds in the United States. On one ground alone over 800 floodlights, developing over 210 million candlepower are installed to facilitate play by night. It is part of the irony of events that an adjacent note (quoted from "Light and Lighting") gives an account of our efforts to produce synthetic starlight.

Fluorescent Train Indicator Boards at Paddington Station

One of the latest developments in the application of fluorescent effects, mentioned in our last issue, is the treatment of the arrival indicator on the "lawn" at Paddington Station.

The indicator board, which measures 30 ft. wide and 16 ft. high, consists of eight banks of station names headed by large numerals indicating the time that the train is due, the platform number, and the number of minutes late. These letters and figures, together with the words "arrival indicator" at the head of the board, and also a clock which is inserted in the centre panel, have been treated with G.E.C. fluorescent powders. No fewer than 8,000 letters were involved, the method utilised being to brush on powder after an adhesive base had been applied.

The board is irradiated by three 125-watt Osira black glass ultra-violet lamps in wide angle dispersive reflectors.



The above picture illustrates a new departure in war-time lighting, the use, at Paddington railway station, of fluorescent material, irradiated by ultra-violet light, for train indicator boards. The great advantage of the method is that only the essential items, i.e., the letters and figures, become luminous.

"Solid" Motion Pictures

The fascinating problem of producing, from a film, pictures which appear to have solid substance has been reviewed by J. A. Norling in the journal of the Society of Motion Picture Engineers (Dec., 1939, p. 612).

In the winter of 1935 a new type of entertainment film ("audioscopiks") was released by Metro-Goldwyn-Mayer. This was the first three-dimensional movie with sound, and was based on the familiar method of viewing complementary red and green images through appropriate spectacles (the glasses for the two eyes transmitting respectively red and green), so that a stereoscopic effect was produced. The effect was striking and the film a very successful one, but it did involve the use of the supplementary viewing device.

Is it possible to produce dimensional effects without this accessory? In this connection the author quotes an apposite statement by Dr. H. E. Ives:—

"There are only two places where the distribution of images to eyes can be done: these are at the screen and at the eyes. The number of images at the screen can be reduced to two if the number of viewing instruments is equal to the number of spectators. The number of viewing instruments can be reduced to zero if the number of images at the screen is made infinite. Any gain in simplification at one point is offset by increase in the complexity or expense at the other."

To increase the number of images at the screen is fraught with so many problems that it does not promise any practical application. Line screens, lenticulated and so forth, have been tried, but no *satisfactory* effect has thus been secured. There have also been a number of schemes, such as movement of the camera during taking, trick lenses, and the use of extremely wide pictures for which a stereoscopic effect has been claimed. But, in the opinion of the author, none of these suggestions has resulted in real three-dimensional movies, and probably never will.

In his contribution Mr. Norland discussed the underlying conditions for successful stereoscopic effect in considerable detail. The only other practicable means, he considers, is that based on polarisation of light, which likewise requires a special viewing apparatus, but has certain advantages—such as the fact that it can be applied to colour films.

The author exhibited a three-dimensional film, obtained by this method, which formed part of the Chrysler Motors exhibit at the World's Fair in New York. This was the first full-size three-dimensional "polaroid" picture made. It was exceedingly successful in illustrating methods of assembling parts of motor-cars. The theatre was kept in continuous operation from 10 a.m. to 10 p.m., as many as 17,000 persons viewing it daily.

The Readability of Stencil-Duplicated Materials

Most of us realise the effect of type and quality of paper on ease in reading. It is less appreciated, perhaps, how greatly stencil-duplicated material differs. Setting aside such defects as imperfect typing, insufficient spacing, etc., important differences in legibility may arise simply from the choice of duplicating material and degree of care in reproduction. This point has been emphasised in a recent contribution prepared in the United States by M. Luckiesh and F. Moss. Two specimens were reproduced, both done with the same typewriter with Standard typewriter type. The difference in boldness and uniformity of the letters is very marked. Tests have led to the conclusion that the "visibility" of stencil-duplicated materials in common use is only about 70 per cent. of what can be achieved under the best conditions.

War-Time Electric Street Lighting

Barking.—Approved fittings have been installed in certain roads, and the council is to consider further extensions.

Birkenhead.—Several of the main roads have been lighted.

Blackpool.—After extensive trial the corporation is considering the provision of war-time street lighting throughout the borough.

Bristol.—A large number of fittings to B.S./A.R.P. 37 have been erected throughout the city.

Derby.—Approved street lighting in the centre of the city and the major part of the area is now practically completed, and the question of providing further lighting is under consideration.

Formby.—All main roads in the area are being lighted.

Fulham.—A comprehensive scheme of war-time street lighting is being adopted.

Glasgow.—Rapid and steady progress is being made with the installation of lighting on all roads in the area.

Manchester.—A scheme on a considerable scale is in course of installation.

Peterborough.—The city council decided in February last to proceed with war-time street lighting. The installation of 287 fittings is now complete, and a further 113 fittings are now in course of erection. Extensions to the scheme are now under consideration.

Reigate.—The council have decided to light all main roads.

Sheffield.—Considerable quantities of B.S./A.R.P. 37 fittings for the 10-ft. and 20-ft. mounting height ranges are being installed.

Torquay.—500 war-time street lighting fittings have been installed.

Some Physical Problems Associated with Gas Lighting

Research at Watson House—The Study of Bunsen Burners and Air-Gas Ratio—Catalytic Lighting Devices — Flame Fires and Integrating Radiometers—Photometry of War-time Street Lighting Units—Entrainment of Gas and Air in the Modern Gas Burner—Maintaining a Stable Flame—Theories of the Incandescent Mantle—Cando-Luminescence—Future Possibilities of Enhanced Efficiency.

Before listening to a paper on the above subject on April 23 members of the Illuminating Engineering Society were given the opportunity of inspecting the research laboratories at Watson House, where there was much of interest to be seen. There were examples of problems directly associated with lighting, such as research on Bunsen burners, methods of determining the air-gas ratio, the catalytic ignition of gas (we seem to be on the way towards complete automatic ignition, without such extraneous aids as dry batteries), and the elimination of noise from control cocks. It was also interesting to observe the methods adopted for testing war-time street-lighting units. It is quite possible, however, that some of those present found even greater interest in sections with which they were less familiar, such as the fascinating apparatus for exploring the radiation from gas fires and the new "flame fire"—surely one of the most lifelike imitations of a wood fire yet devised, and one that seems to give out a heat quite reminiscent of the open hearth of the good old days. Impressive also was the display of apparatus for testing materials, some of it unique.

The paper by L. T. Minchin, A. B. Densham, and J. Wright, subsequently presented by the first-named in the lecture theatre, bristled with knotty points and was illustrated by ingenious experiments—the audience called for an encore of some of them at the close of the evening.

Mr. C. A. Masterman, who, in opening the discussion, conveyed a welcome to members of the Society to Watson House, pointed out that much of the paper was concerned with long-term investigations which, whilst not immediately contributing to the alleviation of the black-out, might ultimately prove of great value. The present conditions should not impose a black-out of scientific endeavour, the result of which will be all the more welcome at the end of the present emergency.

The paper fell naturally into three divisions, devoted to (1) the Entrainment of Air, (2) the Maintenance of a Stable Flame, and (3) the Luminosity of the Gas Mantle. It was explained how, in the modern burner, the pre-mixing of some air with the gas is essential in order to maintain oxidising conditions around the mantle and prevent the deposition of soot. It has also the effect of raising the flame temperature and thus increasing the light output. The mixing is in general effected by allowing the gas to stream out through a fine orifice to which air has access. The authors discussed in some detail the process and its exploration by the "schlieren" and other methods. Careful construction is needed to get an energy efficiency of even 50 per cent. Complete aeration is not normally obtained at ordinary pressures. It is impracticable at present with a low-pressure lighting burner to work with an aeration exceeding 2.3 : 1. Higher pressures, which make possible higher aeration, may lead to a considerable increase in efficiency. Even at low pressures a small increase in aeration increases efficiency materially, and a systematic research has been in progress at Watson House to determine the effect of the dimensions of the burner on the entrained air.

The provision of the mixture of air and gas, however, is only half the battle. When the burning of the mixture is undertaken fresh considerations have to be studied. The structure of the Bunsen flame and, in particular, the nature of the inner cone were debated and the conditions necessary to prevent lighting-back analysed. Of considerable interest is the production, by using perforated metal plates, of a flame-proof burner head. At high aeration a flame appearing as a fine blue mat and consisting of a number of small blue cones with practically no outer flame mantle may be secured. Such a flame is so scattered as not to seem very suitable as a source of light. It is possible, however, that some way of using it for lighting may be found. In that case the high aeration—7 to 1 or over can be obtained—should give rise to higher flame temperature and increased efficiency.

During the last forty years all gas lighting has been based on the mixture of approximately 99 per cent. of thoria, with 1 per cent. of ceria. Though shapes of mantle, types of weave, and design of burner have changed, no better combination has been found. Various explanations based on chemi-luminescence, a "kind of phosphorescence" and catalytic combustion on the surface of the mantle (producing intense local heating), have been offered. Subsequent investigation seemed to establish a simple thermal explanation. The high luminosity appeared to be due to the combination of the low overall emissivity of the thoria with a high emission in the blue region of the visible spectrum and a moderate emission at the red end, due to ceria.

Of recent years, however, the problem has come to be regarded as less simple owing to the fact that luminescence can be excited by contact with flame. Thus zinc oxide at 800° C. is said to glow 115 times as brightly if in contact with flame as if heated electrically. Such "cando-luminescence occurs in substances activated by a small amount of some second substance.

Various theories of cando-luminescence have been suggested. Whatever the true explanation the phenomenon opens up new vistas of progress. On the purely thermal radiation theory of gas lighting there appeared little prospect of increasing efficiency more than, say, 100 per cent.—an amount which, though desirable, would still leave the energy efficiency deplorably low. The present figure for the low-pressure lamp is about 0.2 per cent., whereas values as high as 40 per cent. have been recorded for the chemi-luminescence resulting from the union of sodium and iodine under special conditions.

Once, therefore, the phenomenon of the incandescent mantle is established as being of the nature of luminescence the barriers are down, and there is no longer any theoretical reason why lighting efficiency should not be advanced ten or a hundredfold.

Literature on Lighting

(Abstracts of Recent Articles on Illumination and Photometry in the Technical Press)

(Continued from page 65, April, 1940.)

III.—SOURCES OF LIGHT

109. The Capillary Mercury Lamp as an Oscillograph Light Source.
H. H. Skilling. Elect. Engineering, 59, p. 157, April, 1940.

The advantages of the water-cooled type of mercury vapour discharge lamp for the projection system of the oscillograph are discussed. The use of 500-cycle alternating current is recommended, as having several advantages over either 60-cycle A.C. or D.C. operation. S. S. B.

IV.—LIGHTING EQUIPMENT

110. New Electrical Products.
Anon. El. Rev., Vol. CXXVI., No. 3257, p. 483, April 26, 1940.

Describes, with illustrations, an emergency floating light for use by shipping, two types of low-intensity illumination gauge, and an accumulator handlamp designed for A.R.P. use. R. G. H.

111. Starters for Fluorescent Lamp.
Anon. El. Rev., Vol. CXXVI., No. 3257, p. 480, April 26, 1940.

A design of starter switch is described which preheats the cathodes of the lamp and, by means of a bi-metal strip, breaks the circuit at an appropriate stage, the resulting inductive kick starting the discharge through the lamp. R. G. H.

112. Front Lamps for Tram-Cars.
British Standard Specification, B.S./A.R.P. 41.

Either one or two front lights shall be displayed in accordance with the Lighting Restrictions Order, 1940. With one front light in use the light is to be emitted through an aperture within the limits of 1 and 2 sq. in., and the illumination on a vertical surface 10 ft. distant must not exceed 0.15 ft.c. With two lights (i.) no light must be projected above the horizontal, and (ii.) the illumination under the conditions defined above shall not exceed 2.5 ft.c.—the aperture in this case not exceeding the area of a circle 2 in. in diam. The design of a suitable masked front lamp is illustrated in an appendix. J. S. D.

113. Light Locks at Entrances to Buildings.
British Standard Specification, B.S./A.R.P. k5.

An extended version of the previous edition, now applying to buildings in general. The fundamental requirements remain the same, but selected typical examples such as small buildings (e.g., shops), buildings with a series of entrances rendering possible arcades, and factories and similar buildings where portable light locks can be applied are now discussed. Other special screening devices for van docks, etc., are also illustrated. J. S. D.

114. Factory Ventilation in the Black-Out.
Form 201, issued by H.M. Stationery Office.

Attention is drawn to the drawbacks attendant on methods of "blacking out" which make no provision for ventilation and hints on natural and mechanical ventilation are given. A series of "light traps," which afford ventilation but prevent any appreciable escape of light, are illustrated. J. S. D.

115. Specification No. C-1-1940, for Luminaires for General Lighting.
Committee on Lighting Service. Am. Illum. Eng. Soc. Trans., 3 pp. 267-275, March, 1940.

This specification, drawn up by the American Illuminating Engineering Society, provides a guide to the testing, dimensions, and photometric performance of fittings for general lighting. J. S. S.

116. Design of Built-in Luminaire Constructions for Safe Thermal Operation.
W. Rosebraugh. Am. Illum. Eng. Soc. Trans., 3, pp. 203-217, March, 1940.

Data are presented affording a method of estimating the running temperature in built-in lighting equipment, and of determining the size of such equipment to ensure safe thermal conditions. J. S. S.

V.—APPLICATIONS OF LIGHT

117. Daytime Lighting Requirements for Tunnel Entrances.
K. M. Reid, H. J. Chanon. Am. Illum. Eng. Soc. Trans. 3, pp. 276-279. March, 1940.

The results of experiments on the rapidity with which illumination may fall without substantial loss in the ability to see are applied to the necessary graduation of illumination in tunnel entrances. J. S. S.

118. Drafting Room Lighting Design Employs Ceiling Barriers.
R. W. Wilbraham. El. World, 113, p. 1050. April 6, 1940.

In the lighting of an American drawing office a scheme was adopted using totally indirect lighting, with a ceiling broken by cross-beams and ducts. It is claimed that the broken ceiling has advantages over the flat white ceiling usually adopted with indirect lighting from the point of view of reflected glare. Details of the paints used for the ceiling and for the wall are given. S. S. B.

119. Floodlights for Night Baseball.
Anon. Elect. Engineering, 59, p. 156. April, 1940.

Some details are given of an installation for lighting an American baseball field. It is claimed to be the most powerful so far introduced. S. S. B.

120. Hollywood Ball Park Employs 327 kW.
Anon. El. World, 113, p. 1094. April 6, 1940.

Details are given of the lighting installation at an American baseball ground. It is claimed that with the system adopted an exceptional freedom from glare is obtained, while retaining excellent visibility even for high shots. S. S. B.

121. Light and Architecture.
Anon. Am. Illum. Eng. Soc. Trans., 3, pp. 197-202. March, 1940.

Some representative architectural lighting schemes are described with photographs. J. S. S.

122. Lighting in Relation to Works Output.
Editorial. Elec. 124, p. 298. April 19, 1940.

Attention is drawn to the vital importance of adequate lighting equipment at the present time in works where a twenty-four-hour day is maintained. C. A. M.

123. The Behaviour of a Beam of Light in Fog.
L. M. K. Boelter, F. A. Ryder. Am. Illum. Eng. Soc. Trans. 3, pp. 223-235. March, 1940.

Experimental equipment is described for measuring the illumination due to the veiling brightness of artificial fog illuminated by a parallel beam of light. Measurements of the particle size in the artificial fog compare closely with measurements on natural fog. The results indicate that the veiling brightness is slightly greater in the short wave region, but this effect is small. Nothing is gained by the use of an amber beam if the lumens in the beam and its distribution are unaltered. J. S. S.

War-time Street Lighting by Gas

A pamphlet on this subject has recently been prepared by the Joint Lighting Committee of the Institution of Gas Engineers, emphasising the value of the new street lighting as an aid to movement and affording "comfort value." Statutory obligations and the nature of the approved standardised fittings are explained, and a specimen of B.S.I. certification mark is illustrated. Adaptations of existing units are rarely financially justifiable. There is every inducement to adopt the relatively inexpensive standard fittings. Some useful hints on installation and spacing are furnished.

Of special interest—because we do not recollect seeing them thus assembled elsewhere—is the reproduction, in appendices, of two statements from Sir John Anderson and the letter from the Ministry of Home Security to local authorities in regard to the new lighting.

Particulars of some additional war-time street lighting installations are given below:—

Wombwell Gas Department's installation of "starlights," thirty of the central street lighting type in the main street and thirty of the footpath type, has been the subject of much favourable local comment.

The Chislehurst and Sidcup Urban District Council have decided to adopt modified street lighting over a considerable area. The installation will consist of 155 gas conversion units for "London" lamps in all first-class traffic routes, 278 such units for "Rochester" lamps in the second-class traffic routes, and 299 for "Windsor" square lamps in certain residential roads. The installation will be put into operation on October 1.

Grantham Town Council has issued instructions to install 211 gas "starlight" units in the local streets, in addition to the twenty-five directional lamps that have been in use since the outbreak of war.

Recent Patents

(Abstracts of recent Patents on Illumination & Photometry.)

No. 513,217. "Improvements in Lighting Fittings."
The General Electric Company, Ltd., and Beggs, S. S. Dated March 30, 1938.

This specification refers to directional light fittings to be used in conjunction with light sources of high specific brightness (e.g., mercury lamps of 1,500 c.p. per sq. cm.) and of small size compared with the dimensions of fittings. Its objects are to achieve precise control of distribution of light and to counteract glare. Prismatic elements are arranged on the glass surface in such a way that—in the direction of the main beam—practically the whole face of the fitting emits light. No part of it shows an apparent brightness substantially greater than would occur if the light from the source housed in the fitting were uniformly distributed over the whole area of the "working" face. The refracting elements are constituted by two sets, one on the external and one on the internal surface of the glass. The edges of one set may be concentric circles in parallel planes constituting a drum lens surrounding the light source. These prisms determine the light distribution in cones with vertical axes. The curvatures of these prisms differ from each other to give light in one "preferred" cone mainly. The second set of elements has edges running perpendicular to those of the first, thus determining the light distribution within the cones created by the first.

No. 513,321. "Improvements in or relating to Electric Discharge Lamps."
Siemens Electric Lamps and Supplies, Ltd., Aldington, J. N. and Meadowcroft, A. J. Dated April 1, 1938.

This invention refers to high-pressure mercury vapour lamps with a high specific brightness and with electrodes in a position comparatively near to each other. Such lamps have hitherto been equipped with thermionically activated electrodes, at least for starting purposes. Such electrodes, however, cause early blackening of the glass walls and the following improved construction is, therefore, suggested: The new electrode consists of more massive refractory material, such as sintered blocks of tungsten, resting on supports of refractory metal of a lighter, i.e., less massive nature When the lamp starts these supports are heated up rapidly by the passage of the discharge current. An arc is initiated between the massive electrodes but moves towards the lighter supports owing to the higher temperature of the latter. Consequently the supports heat up still further and quickly attain a temperature level sufficient to vaporise the mercury rapidly. As the vapour pressure rises the arc shortens, and eventually the arc passes from one electrode's tip to the other and the temperature of the supports drops considerably.

No. 513,332. "Improvements in and relating to Cathode Ray Devices."
The British Thomson-Houston Company, Ltd., Anderson, J. T., Gaboe, D., Warren, H. W. H., and Wells, R. S. Dated April 5, 1938.

The invention relates to high-power cathode ray tubes suitable for large screen projection. Large screens, e.g., those used in cinemas measure about 24 by 30 ft., and require approximately 10 lumens per sq. ft., or a total of about 7,000 lumens. General luminescent screen efficiency is of the order of 25 lumens/W., and the loss in the optical system 50 per cent. The power of the source, therefore, should be about 500 W. The size of the luminous screen usually does not exceed three inches square for reason of expense. The input densities would, therefore, attain 125 W. per sq. inch. The maximum densities hitherto applied are one-tenth of that value, and can only be effected with considerable sacrifice of life. The improved construction provides a fluorescent screen backed by a (water cooled) metal plate which consists at least superficially of aluminium, beryllium or magnesium. The area of the surface should be artificially enlarged by grooves or pits formed by engraving or etching, or by means of a special crystallisation process. The luminous top layer should be thinner than the penetration depth of the bombarding electron. It has been found that during the passage of the recording spot very high transient temperatures are produced when electrons slow down and lose hereby energy. The penetration depth in light metals is high, and taking into account their greater specific heat, the temperatures produced by the bombardment in the backing material will be kept below levels which might endanger the luminous coating in spite of increased input densities.

No. 513,358. "Reflective Surfaces for Roadside Kerbs and the like."
Mitchell, C. E. Dated January 18, 1939.

The specification refers to an improved design of a previously patented reflective element for kerbs, edgings, etc. It deals with light-reflective facets embodied in tiles of light-coloured glazed or reflective material, corrugated or indented to provide the maximum of reflective surface and inserted in a continuous series or at close intervals in the upper face of the kerb.

No. 513,371. "Improvements in and relating to Picture Telegraph and like Systems."
Rediffusion, Ltd., and Aderjan, P. Dated April 8, 1938.

The object of this invention is to increase the speed of picture transmission effected by wire or wireless path. The system used is of the known type in which the amplitude of the transmittent current varies with the picture brightness, but, here, the scanning speed likewise varying. The scanning speed influences the synchronising signal, and on the receiver side the latter controls the scanning speed in its turn. An oscillator controlling the revolutions of the picture drum motor is in circuit with an inductance the core of which is in a circuit branched off from the main transmitter. Thus, when modulation is effected due to blackness of the picture, the frequency of the synchronising current is affected, the inductance changes its value, and the motor speed is varied.

No. 513,451. "Improvements Relating to the Enamelling of Metallic Articles."
I.G. Farbenindustrie A.G. Dated April 11, 1938 (*Convention*).

It has been found that, particularly in the case of cast-iron objects to be enamelled, a fritted foundation shows better properties of adhesion and greater resistance to temperature variation than fused foundation, and the specification deals with an improved process to provide a proper fritted layer.

A.R.P. Lighting in Germany

Whilst information on "black out" methods adopted in Germany is not very easily obtainable, it may be noted that descriptions of methods have appeared in *Das Licht* (October 20, 1939). This and other information has also been presented in English, for example, in a useful article in *Engineering* (February 2, 1940).

Attention is there drawn to the experiences of British airmen flying over Austria and Czecho-Slovakia who observed that Vienna, Prague, and other cities were at times almost normally lighted, whilst, even when the lighting had been apparently diminished after a warning, the "black out" was nothing like so general nor so rigid as is practised in this country. In Germany, however, where in principle street lighting has likewise been abolished, the black out seems to be much more complete.

With a view to minimising the resultant danger to traffic and pedestrians, reliance seems to have been placed largely on pilot lamps, intended to mark dangerous points on the road, and afford what is apparently "beacon lighting." It is stated that such lamps should be recognisable at a distance of at least 450 ft. They must be rigidly mounted. Each lamp is intended to light an area approximately 90 ft. in diameter. The illumination at the foot of the lamp must not exceed 0.1 lux (very roughly 0.01 ft.c.).

In *Das Licht* two types of lighting fittings, both utilising opaque reflectors, were illustrated. The simplest of these allows only a narrow ring of diffused light situated in the horizontal plane of the rim of the reflector. A second and more elaborate type permits, in addition, a narrow ring of light to escape in a vertical plane, an over-reflector being introduced above this luminous ring, which is situated near the neck of the reflector underneath. The distribution of light is only specified in very general terms, e.g., it is stated that the candlepower derived from the vertical ring should keep within a ratio of 1:5 within 65° on either side of the vertical; also that no light must be emitted at an angle exceeding 95° from the vertical, and that the candlepower of the annulus between 90° and 95° must not exceed 0.5 candles (Hefner).

Whilst other possible devices (such as lamps run at reduced voltage) are not excluded, fittings of the special types mentioned above should be used wherever possible. In particular, with a view to minimising glare, the use of direct light is discouraged.

In certain circumstances somewhat more generous "restricted street lighting" is permitted, on condition that it can be switched off instantly in the event of an air raid. Fittings thus used may be equipped with 15 watt lamps and so screened that only light penetrating through a ring of diffusing glass is exposed to view. Such lamps must be mounted 24 ft. high and in general arranged at distances of 180 ft. to 240 ft. apart. Particulars are also given of the use of red-screened neon lamps, installed on pillars to serve as "traffic tortoises," i.e., to indicate tram stops, etc.

Attention is also devoted to methods of screening windows. A complete black out by means of curtains, shutters, etc., is evidently regarded as presenting great difficulty, and special devices, to be used where complete black out is impracticable, are described. Instances are afforded by 8, 15, and 25 watt lamps, the bulbs of which are blackened but have a clear ring or area through which some light escapes. In certain cases, where the blackening is assymetric, rotatable caps are provided in order that the lamps can be so adjusted in their sockets that the blackened area faces the window.

Considerable use of fluorescent devices in power stations, boiler houses, colliery winder plants, etc., is reported. The methods adopted are in general familiar, though the use of glass paving tiles coated with zinc sulphide is something of a novelty.

Century House

The outbreak of war rather caused the entry of Philips Lamps, Ltd., into Century House, their new premises in Shaftesbury-avenue, London, W.C.2, to be overlooked. The building is an imposing one, 200 ft. long, 70 ft. wide, and about 100 ft. high, and on the ground floor there is ample room for showrooms and demonstrations.

During a recent visit we had an opportunity of seeing some of the demonstrations available, many of them arranged in a very effective and compact form. Typical lighting fittings are on view overhead. A special feature is the demonstration from a switch board of all the varieties of Philips' lamps available, technical data being in each case set out on a chart immediately behind the exhibit itself, which can be displayed by swinging aside the panel in front. Other notable exhibits include the familiar "set back" street lighting photograph with miniature imitations of sodium units displayed at intervals—a very lifelike display. Adjacent to this is other display material featuring street lighting, which we understood was intended for the A.P.L.E. exhibition at Glasgow—perforce abandoned at the outbreak of war. There is also an exhibit showing the comparative effects of the inspection of small objects by sodium and white light respectively and the result of a combination of sodium and mercury vapour lamps in a single unit.

In an adjacent dark room demonstrations of the latest air-cooled and water-cooled high pressure mercury lamps are given.

Perhaps the most striking demonstrations are those in the fluorescent room, where the possibilities of this new and popular method of display are very effectively illustrated. We recall as specially interesting the exhibits contrasting the appearance of fluorescent landscapes and those painted with ordinary pigments, the demonstration of the vivid effect of a photograph with a fluorescent background under a "black" lamp, and the series of specimens from different makers of phosphorescent and fluorescent material, showing the great variety of tints now available.

E.L.M.A. Special Conference on War-Time Industrial Lighting

(Wednesday, May 22, 1940)

What promises to be a very interesting conference on War-time Industrial Lighting is to be held at the E.L.M.A. Lighting Service Bureau (2, Savoy Hill, London, W.C.2), on Wednesday, May 22. As we go to press we receive the following particulars of the programme:—

11.30 a.m. Reception. C. H. Cox (chairman of E.L.M.A. Council).
Introductory remarks by A. W. Garrett, H.M. Chief Inspector of Factories.

11.45 a.m. "Lighting for War-time Production," H. Lingard, A.M.I.E.E. The effect of illumination on industrial efficiency. Compensating for loss of daylight. The prevention of accidents and reduction of fatigue.
Discussion opened by G. H. Buckle (Wingfield, Bowles and Partners).

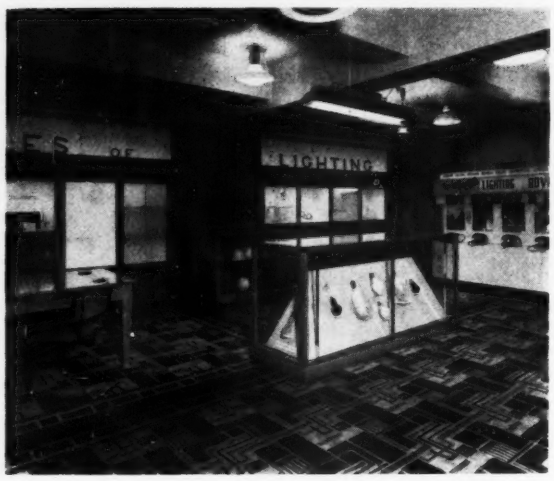
2.30 p.m. Demonstration of Lighting Intensities and Recent Lamp Developments. W. J. Jones, M.Sc., M.I.E.E. Installations of 0.002 to 100 foot-candles, and the development of new electric lamps.

3.30 p.m. Tea.

4.0 p.m. "Industrial Lighting Problems of the Black-out." A. D. S. Atkinson. The implications of the "Lighting (Restrictions) Order"; obscuration, ventilator light traps and light locks. Restricted exterior lighting and its design.
Discussion opened by R. W. Daniel, A.M. Inst. C.E. (Ministry of Home Security).

The New Lighting Service Department in Leeds

A Useful War-Time Addition to the Leeds Corporation Electricity Showrooms.



We illustrate above a view of the demonstration room in the new lighting service department in Leeds which Mr. F. Nicholls, of the Leeds Corporation Electric Supply, has recently provided in his showrooms. This new departure has excited considerable local interest. Mr. J. W. Howell, the E.L.M.A. Lighting Service Bureau representative in Leeds, rendered considerable assistance in connection with the planning and design of the department, which is to be of a permanent nature.

Many of the familiar demonstrations at the E.L.M.A. Bureau London headquarters are on view.

The new 80-watt tubular fluorescent lamps, one of which is seen occupying a prominent position in the photograph reproduced above, play an important part in illuminating actual displays as well as demonstrating their advantage in the field of war-time production.

Other demonstrations include the following:—

Concentrated lighting through louvres over an office table.
Cornice lighting suitable for shop interiors.
Demonstrations of the importance of maintenance.
The effect of tungsten and mercury discharge lamps on shop window displays.
Special textile lighting demonstrations.

Apart from the many practical demonstrations there are a large number of photographs illustrating points which space limitations make it impossible to include in the department itself.

An A.R.P. Torch

An interesting new invention has been made in France. It consists of an electric torch which is claimed to meet all conditions of A.R.P. lighting, viz., light to be projected only downwards and on no account upwards. The torch lights only when its top is turned downwards and extinguishes automatically in a horizontal or upward position. This is effected by means of a simple mercury contact, the so-called "Gyrovalve." The design of the torch embodies two dry cells, one of which is a spare. At the base of the arrangement the bulb is mounted with, facing downwards, a reflector which allows only the emission of light within an angle of 45 deg. A little gas-filled glass tube with a mercury drop inside serves to interrupt the circuit, contact only being made when the ends of the wires are connected by the mercury in its lowest position. When the torch is turned upwards the mercury recedes and contact is broken. The dimensions of the torch are 6 in. by 2¾ in. by 1¾ in. It can thus be conveniently held in the hand and operated by pressing the contact switch.

NOTES ON ILLUMINATING ENGINEERING ABROAD

(Specially Contributed—H. L. J.)

United States.

A survey of lighting practice applying to the specific conditions met with in the chemical industry has been undertaken and recently been published in "Chemical Engineering." This constitutes an assembly of comprehensive information received from various organisations as, e.g., Underwriters' Laboratories, I.E.S., National Board of Fire Underwriters, Committee on Flammable Liquids of the National Fire Protection Association.

This report discusses a number of interesting points, as follows: In introductory notes at the outset of the report it is strongly advocated that installations of a certain age should be surveyed and, if necessary, modernised, so as to be in keeping with the rapid development of light sources during recent years. Those in charge of works should make sure that lamps designed for special purposes are actually used for such. All installations should comply strictly with the existing regulations, particularly those utilising explosion-proof and dust-tight types of fittings. The use of handlamps in hazardous locations should be abolished.

In the event of it being decided to improve lighting conditions, it is urged that improvements should not be confined to certain localities (in deference to the wishes of individual workers). The aim should be to provide a thoroughly planned installation, "tailored" to fit an entire operation based on a systematic survey of the plant lay-out.

The intensity of illumination desirable varies according to the different production processes. In general, it is considered good standard present practice to provide up to 50 ft.c. for general illumination, with a supplementary illumination of 100-150 ft.c. where local lights are permissible. Detailed values are given in tables, reiterating the foot-candles values recommended by the I.E.S.

In regard to ceiling fittings, a distance apart not more than equal to the mounting height is specified. Portable lamps should be carefully examined before purchase. Here again many cases require "tailor-made" types rather than "over-all" types, less expensive, though also less useful. In regard to contrast, it is suggested as a rough rule that the brightness ratio between working plane and surroundings should not exceed 10 : 1. If interpreted in foot-candles this ratio might result in a greater contrast, particularly if coloured light sources are used.

In the discussion of modern light sources the fluorescent type, notable for the complete absence of undesirable heat effects, is warmly recommended. Where high foot-candle values are desired a couple of lamps should be housed in one fitting. Polarised light should be utilised for inspection purposes, e.g., to detect strains in glass, mounted lenses, radio tubes, transparent plastics, etc. When an analysing screen is applied strained areas appear as colour fringes in the material. This method has also been used with success lately for inspection of inflated rubber articles.

In a similar manner ultra-violet sources may be utilised to trace fluorescent particles. Among new lamps for special purposes the Drying Lamps, which in some cases offer a saving on production time up to 15 per cent., are mentioned; mention is also made of the "Bake-Oven" Lamps. These are tungsten lamps with special basing cement withstanding temperatures up to 550° F. Their leading-in wires are welded to the base and asbestos insulation is placed in between the two in order to prevent possible short circuit through falling oxide. The bulbs are subjected to special exhaustion treatment so as to give better performance at high external temperatures.

Another special type mentioned is the "Vibration-Service" Lamp. This consists of a special filament construction deliberately less sag-resistant, to allow the coils to open up under vibration and thus preventing short circuits. These lamps are only available in 50 watt types and are restricted to a vertical burning position. The "Rough-Service" Lamps, the last species discussed, in this survey, have small mandrel coils to counteract shocks efficiently and a comparatively great number of filament supports (e.g., sixteen for 50 watt). They are necessarily less efficient and are available in 50 and 100 watt types.

Character and degree of hazards prevailing in chemical production vary considerably. To meet practical conditions and provide for appropriate constructions of explosion-proof electrical equipment, the National Electric Code distinguishes between four groups of hazardous locations the first being the most dangerous:

Class I—Rooms where flammable volatile liquids and gases are present.

Class II—Ditto, metallic and non-metallic dusts.

Class III—Ditto, fibres or combustible flyings.

Class IV—Ditto, fibre storage.

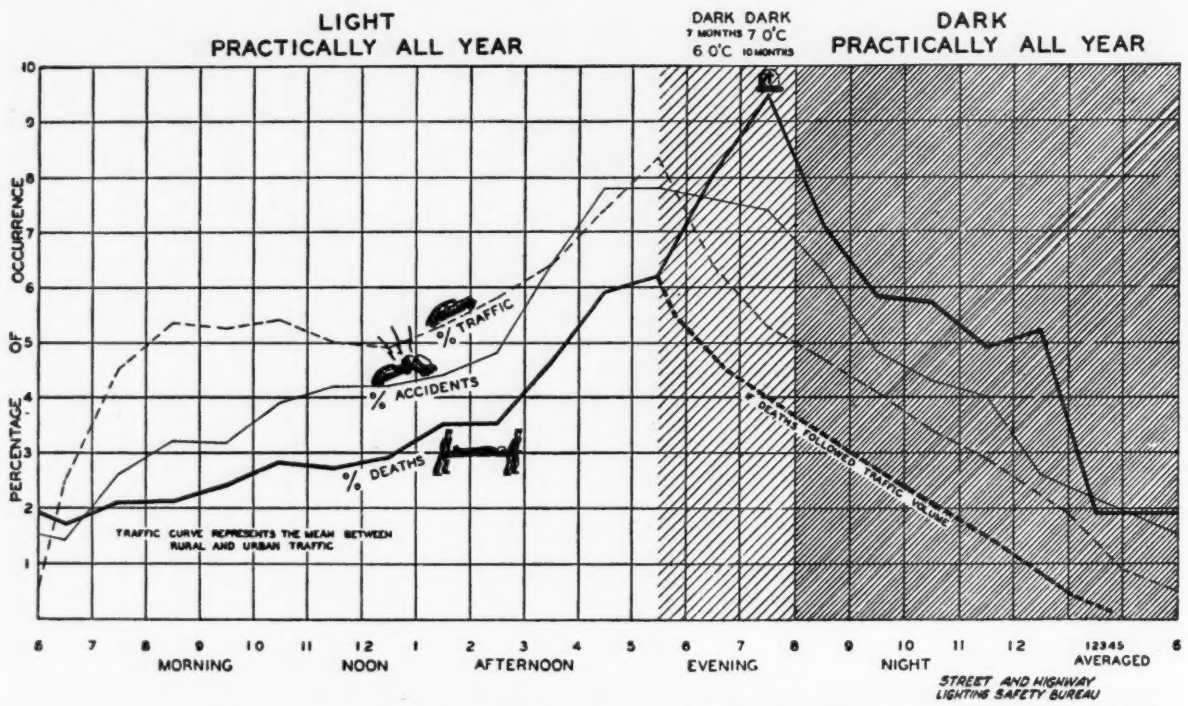
Furthermore, a tentative grouping of common gases and vapours has been undertaken: A: The most hazardous (such as acetylene); B—less hazardous (such as hydrogen); C—medium (such as ether); and finally D—(such as gasoline). A table is attached to the original source of information giving the fire hazard properties in detail for quite a number of different gases, vapours, etc.

Class I regulations in the National Electric Code demand the exclusive use of tested and approved apparatus such as switches, etc. Lighting fittings must be totally enclosed and properly protected against breakage of glass parts. The fittings must be strongly supported. Cord pendants are forbidden. Portable lamps in general are not permitted: only in special cases may those of an approved construction be used. Lampholders should be of the keyless type, of moulded composition and without any metal parts showing. Cable and cords should carry one extra insulated conductor to form the grounding connection. Special provisions are to be made against possible breaks at the point of connection to the supply conductor. No lamps shall be fixed near spray booths or air ducts connected therewith. The auxiliaries of mercury lamps shall be at least 10 ft. distant from the spray booth. Class II is subject to similar regulations although less strict as they deal with dust-tight fittings.

Germany.

The German Illuminating Engineering Society is considering the introduction of a new term called "Dark-Brightness" in an endeavour to achieve proper valuation of black-out conditions. A specification relating thereto defining the term has recently been drafted and public criticism is invited. The unit of "Dark-Brightness" will be: 1 *skotos* which is to equal 1 milliapostilb at a colour temperature of 2,360° K. The new term shall only be applicable for a range up to 10 skotos and shall not be used for the measurement of prime light sources. The corresponding term of illumination is to be called 1 *nox* and is to equal .001 lux.

The Relation between Traffic Volume and Accidents by Day and Night



The above chart which appeared in a Report of Traffic Safety Lighting published in the Transactions of the American Illuminating Engineering Society (November 1939) shows very strikingly the greater traffic hazards prevailing by night. Had the fatal accidents during darkness continued in accordance with the daylight relation to volume of traffic the curve would have followed the lower dotted line. The actual course is shown by the full black line—the difference being specially striking during the evening rush period.

The Illuminating Engineering Societ (U.S.A.)

Notes on Transactions (April, 1940)

NEWS: The I.E.S. was again represented at this year's Convention of the American Association of School Administrators with an exhibit. On previous occasions the exhibit was based on the "American Recommended Practice of School Lighting." On this occasion, however, a more educational line, based on the "*Study of Lighting*," was followed. A manual for classroom use, compiled by the Society, is now being issued. *The* 1940 *Revised Edition of "Seeing,"* a guide to the best use and care of the eyes, has been issued by the Western Institute of Light and Vision, Los Angeles.—*Four new infra-red drying Lamps* in 250 to 1,000 watt sizes, designed for industrial or commercial drying and heating jobs, have been announced.—The Oregon State Highway Department published in its Technical Bulletin No. 12 the results of highway tests to determine *the light reflecting characteristics of nine different road surfaces.—Dr. E. C. Crittenden,* Chief of the Electrical Division, National Bureau of Standards, Washington, has been elected President of the U.S. National Committee of the International Electrotechnical Commission.—*Mr. Norman W. Storer,* retired Consulting Engineer of Westinghouse Electric and Manufacturing Company, has been awarded the 1939 Lamme Medal of the American Institute of Electrical Engineers.—*The ninth I.E.S. Prize Competition*—"A women's wear shop"—was decided upon on February 3, after 156 solutions had been submitted by students of nineteen different institutions. The first prize was awarded to Mr. J. Gelgisser, New York University.

CONTRIBUTIONS: *An Architect Looks at Illumination,* by W. T. Rolfe. Light as a tool for the architect is discussed in the different aspects of its application. The importance of large scale lighting arrangements for exhibitions such as the present World's Fairs in order to achieve good architectural lighting is emphasised.

The Calculation of Illumination from Sun and Sky, by E. Elvegard and G. Sjoestedt. Daylight, the sum of light from the sun and the sky, varies in intensity with the seasons and the atmospheric conditions of the place in question (e.g., factory town with a smoky atmosphere). It is proposed to base the calculation of the sun's intensity on its height and not on the date and hour.

Colour Matching at the Forbes Varnish Company, by R. F. Wysocki and A. K. Gaetjens. The efficiency of a new lighting installation, erected to check colour matching of lacquers and baked enamel samples against standards, is discussed. Thirty-six fluorescent daylight lamps are used wired in three circuits. These are independently switched, each circuit giving an illumination of 175 f.c. on the samples to be tested. Direct light from the source to the operator is completely cut off and the background blacked as far as it tends to create specular reflection during the test. The rest of the background is painted grey of 35 per cent. reflection factor. *External Plant Lighting for Safety,* by D. M. Diggs. More extensive use of Flood-lighting Installations on (mainly) industrial premises is advocated as efficient means against sabotage. Technical details of scheming such installations include the deliberate utilisation of glare to increase the "defensive" value of such installations.

The Cylindrical Web for Isocandles, by B. Monash. The transformation of an "onion" diagram into a cylindrical one is described and the respective theoretical information presented.

The Source of Light

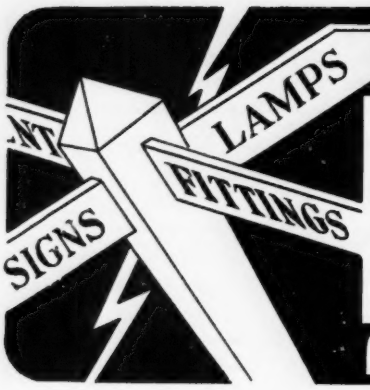
The lighting restrictions are introducing many people, for the first time, to problems and definitions that have long been the subject of discussion by technicians. One evident problem in connection with shop windows is the definition of a "source of light"—can a moderately bright object which only reflects light be considered a source?

The following conversation, reported to have recently taken place in Tottenham Police Court, is instructive:—

Solicitor: The source of light is surely the electric globe?

Police officer: As far as we are concerned the source of the light is the point from which it emanates and not that from which it originates.

A decision for which there is surely technical support—for do not lighting experts constantly frame their calculations in terms of illuminated ceilings, friezes, etc., regarded as sources of light?



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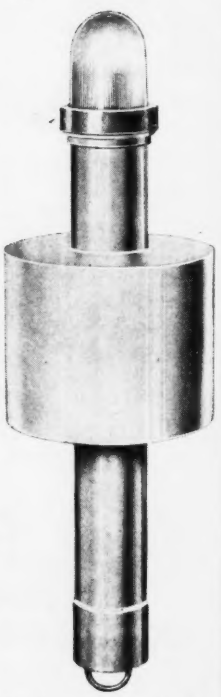
MODEL 'B'

Index to "Where to Buy"

N.B.—The numbers are those attached to individual entries in the Directory (See pp. 90—92)

For Increased Safety at Sea

The G.E.C. "Life-Light" here illustrated is of special interest at the present moment when the normal hazards of seafaring life have been enormously increased. The device is the result of an effort to furnish an emergency electric floating light, of special value where large quantities of oil are liable to be released on the surface of the water. It is suitable for use in passenger ships and cargo ships, trawlers, oil tankers, and minesweepers, and is both simple in design and robust in construction. It consists essentially of a metal cylinder, which contains the lamp, dry cells, and automatic switch, and is equipped with a buoyancy chamber or float. It is designed for normal stowing in the inverted position, and the light is then extinguished. When reversed (with the bulb upwards), however, it lights automatically, and when thrown into the water remains alight as it floats freely. It may be attached by lanyard to buoys or rafts, or may be placed in a suitable position either for throwing overboard or for floating away if the ship sinks. A great advantage is that the light has at least six inches of freeboard, thus making it visible from a considerable distance in all directions as well as from the air. This amount of freeboard also keeps it well above any oil that may be on the surface. Since the electric bulb is enclosed, there is no danger of igniting oil, even when floating in it, so that the light can be carried safely in oil tankers.



The G.E.C. "Life-Light" (in lighted position).

The device is fitted with a 3.5 v. 0.3 amp. Osram lamp. Two 1½ v. cells, either of the dry type or inert type, are used, and a continuous burning life of over twenty hours is obtainable. Unit cells of the universal type may also be used, in which case a life of about eight hours may be obtained. Apart from rescue work, the "life-light" has many other useful applications; for example, as a marker buoy for fishing vessels and for emergency lighting generally.

"Ensur-a-Lite Junior" Lighting Unit

Ediswan are placing on the market an accumulator handlamp which will give fifty to sixty hours of light for one charge. The assembly of this "Ensur-a-Lite Junior" unit is very simple, and consists only of a small 2-volt Ediswan accumulator with bulb attachment and switch. The electrolyte is unspillable, and the bulb is hooded to ensure concentration of light in a downward direction. The price of the unit is only 7s. 6d. complete.

We are informed that G.V.D. Illuminators, Ltd., have been responsible for the new lighting at the Chapel of the Savoy, the reconstruction and redecoration of which has recently been completed.